

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
4 August 2005 (04.08.2005)

PCT

(10) International Publication Number
WO 2005/071477 A1

(51) International Patent Classification⁷: **G02F 1/1343**,
1/1337

(74) Agents: **MAEDA, Hiroshi** et al.; Osaka-Marubeni Bldg.,
5-7, Hommachi 2-chome, Chuo-ku, Osaka-shi, Osaka
5410053 (JP).

(21) International Application Number:
PCT/JP2005/001047

(81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(22) International Filing Date: 20 January 2005 (20.01.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2004-017667 26 January 2004 (26.01.2004) JP

(71) Applicant (*for all designated States except US*): **SHARP
KABUSHIKI KAISHA** [JP/JP]; 22-22, Nagaike-cho,
Abeno-ku, Osaka-shi, Osaka 5458522 (JP).

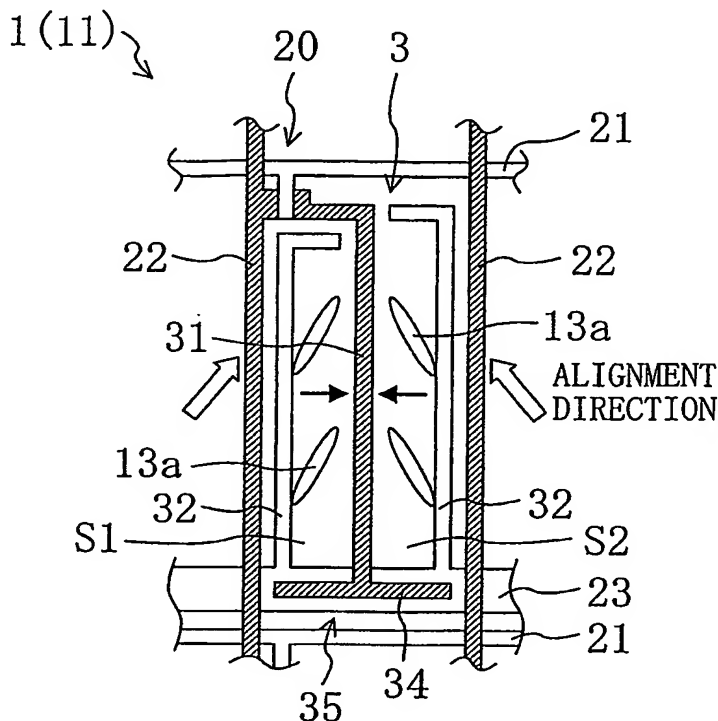
(84) Designated States (*unless otherwise indicated, for every
kind of regional protection available*): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **MIYACHI, Koichi**
[JP/JP]; 3-9-7, Sakuragaoka, Seika-cho, Soraku-gun, Ky-
oto 6190232 (JP). **INOUE, Ichiro** [JP/JP]; 2230-107, Ichi-
nomoto-cho, Tenri-shi, Nara 6320004 (JP).

[Continued on next page]

(54) Title: **LIQUID CRYSTAL DISPLAY DEVICE AND METHOD FOR DRIVING THE SAME**



(57) Abstract: A pixel 3 includes a pixel electrode 31 and opposed electrodes 32 for generating electric fields between a pair of substrates in directions substantially parallel to the substrates and also includes two regions S1 and S2 defined by the pixel electrode 31 and the opposed electrodes 32. The electric fields are generated in the adjacent regions S1 and S2 in opposite directions. A liquid crystal layer has a structure in which a slow axis indicating a refractive-index anisotropy as viewed in a direction normal to the substrates is vertical to the electric-field direction without an application of an electric field whereas slow axis in these regions S1 and S2 rotate about axes normal to the substrates in opposite directions. In this manner, the viewing angle of a liquid crystal display device is increased and coloring is prevented. In addition, the response speed and the aperture ratio are enhanced.



Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.